

CLAIMS

We claim:

5        1. A backup management system for providing basic system functions in a computer system, comprising:

      a plurality of system sensors for detecting power, temperature, and cooling fan speed in the computer system;

      a management processor, coupled to said sensors;

10        a high-availability controller, operably coupled to said management processor and to said sensors;

      a management processor status signal, generated by said management processor to indicate an operational state thereof, and coupled to said high availability controller;

      wherein said sensors include:

          a plurality of power controllers, each of which monitors the state of an associated power supply in the computer system, and controls power thereto; and

          at least one cooling fan controller for detecting and controlling said cooling fan speed;

      wherein, during normal operation of the computer system, said management processor monitors outputs from said sensors and sends control signals to said power controllers and to said fan module;

      and

25        wherein, in response to detecting that said management processor status signal is inactive, said high availability controller generates control signals in response to outputs from said sensors to control operation of said power controllers and said fan controller.

2. The backup management system of claim 1, including a non-software coded state machine that monitors said management processor status signal and causes said high availability controller to generate said control signals when said status signal is inactive;

      wherein said state machine performs a different sequence of operations than the code executed by said management processor.

3. The backup management system of claim 2, wherein said state machine is a field programmable gate array.

4. The backup management system of claim 1, including at least one cell comprising a plurality of processors and a local power module for controlling power to the cell, wherein said cell is coupled to said management processor and said high availability controller;

5       wherein said high availability controller receives signals from said local power module including a device ready signal and a power fault signal, and

10      wherein, in response to an inactive said processor status signal, said high availability controller sends a power enable signal to the local power module in response to receiving said device ready signal in the absence of a power fault signal received therefrom.

15      5. The backup management system of claim 1, further including a power switch, for controlling bulk power to the computer system, coupled to said management processor and said high availability controller; wherein said high-availability controller is responsive to an output from the power switch to initiate powering down of each said power supply when the management processor has failed.

20      6. The backup management system of claim 1, wherein said management processor includes a watchdog timer that sets said management processor status signal to an inactive state when the management processor does not reset the timer within a predetermined period of time.

25      7. The backup management system of claim 1, including a plurality of front panel indicators coupled to, and responsive to output signals from, said management processor and said high availability controller.

8. A method for backup management of basic system functions in a computer system, the method comprising the steps of:

30       monitoring, via a management processor, a plurality of sensors for detecting power, temperature, and cooling fan speed in the computer system; generating a processor status signal to indicate an operational state of said management processor;

monitoring said processor status signal; and  
generating, in response to detecting that said processor status signal is inactive,  
    backup control signals, in response to outputs from said sensors, to  
    control operation of said controllers;  
5      wherein said backup control signals are generated by a non-software coded state  
    machine, operably coupled to said management processor, said sensors,  
    and said controllers.

9. The method of claim 8, wherein said state machine performs a different  
sequence of operations than the code executed by said management processor.

10     10. The method of claim 9, wherein said state machine is a field programmable  
gate array.

11. The method of claim 8, wherein said sensors include at least one cooling  
fan controller for detecting and controlling said cooling fan speed, and a plurality of  
power controllers, each of which monitors the state of, and controls power to, an  
associated power supply in the computer system, including the step of:  
    sending said control signals and said backup control signals to said power  
    controllers and to said fan module.

12. The method of claim 11, including a power switch, for controlling bulk  
power to the computer system, including the step of:  
    initiating powering down of each said power supply when the management  
    processor has failed and the power switch is pressed.

13. The method of claim 8, including at least one cell comprising a plurality of  
processors and local power module for controlling power to the cell, including the  
step of:

25     monitoring signals, including a device ready signal and a power fault signal,  
    from said local power module, and  
    in response to an inactive said processor status signal, sending a power enable  
    signal to the local power module in response to receiving said device  
    ready signal in the absence of a power fault signal received therefrom.

14. The method of claim 8, including the step of setting a watchdog timer that generates an inactive said processor status signal when the management processor does not reset the timer within a predetermined period of time.

15. The method of claim 8, wherein said backup control signals also control a plurality of front panel indicators.

16. A backup management system for providing basic system control functions in a computer system comprising:

10 a plurality of system sensors for detecting signals from at least two devices in the group of devices consisting of a power module for monitoring the state of an associated power supply in the computer system, a temperature sensor for monitoring temperature in the computer system, and a cooling fan speed module for detecting and controlling system cooling fan speed;

a management processor, coupled to said system sensors;

15 a management processor status signal, generated by said management processor to indicate an operational state thereof;

a non-software coded state machine, operably coupled to said management processor and to said system sensors, wherein said state machine performs a different sequence of operations than the code executed by said management processor;

20 wherein, in response to detecting that said status signal is inactive, said state machine generates control signals to said power controllers and to said fan module in response to outputs from said system sensors to control the operation thereof.

25 17. The backup management system of claim 16, wherein said controllers

include:

a plurality of power controllers, each of which monitors the state of an associated power supply in the computer system, and controls power thereto; and

30 at least one cooling fan controller for detecting and controlling said cooling fan speed.

18. The backup management system of claim 16, wherein said state machine is a field programmable gate array.
19. The backup management system of claim 16, wherein said management processor includes a watchdog timer that sets said processor status signal to an inactive state when the management processor does not reset the timer within a predetermined period of time.  
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20. The backup management system of claim 16, including a plurality of front panel indicators coupled to, and responsive to output signals from, said management processor and said high availability controller.